

Stroke in Young Adults: Experience at Abakaliki South East Nigeria

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Abstract

Objectives: Stroke is a major cause of morbidity and mortality worldwide. It is increasingly common from the sixth decade, but is particularly tragic when it occurs in young adults. There are limited studies of stroke in young adults in Nigeria. It is against this background that we embarked on this prospective hospital based study to determine the epidemiology, pattern and case fatality rate of stroke in young adults in Abakaliki Southeastern part of Nigeria. **Patients and Method:** The stroke patients between the ages of 18 - 50 years admitted to the medical wards of a tertiary health centre at Abakaliki Nigeria from 1st August 2012 to 30th April 2019 were consecutively recruited. They were followed up till discharge. Relevant data like biodata, and clinical features of the patients were extracted and analyzed. **Results:** A total of 983 (males—511, females—472) stroke cases were seen with 197 between 18 - 50 years. One hundred and fifty two (77%) did neuroimaging (mean age—40.7 years). Eighty-eight (57.9%) had Cerebral infarct (males—42, females—46) while 64 (42.1%) had Hemorrhagic stroke (males—35, females—29). For those that had hemorrhagic stroke, 11 (17.2%) were Subarachnoid hemorrhage (SAH) while 52 (82.8%) were Intracerebral hemorrhage (ICH). The identified risk factors range from hypertension, DM, dyslipidemia, alcoholism, cigarette smoking, HIV infection and chronic use of coffee drinks. Sixteen patients died during the admission with case fatality rate of 10.5%. **Conclusion:** Stroke is actually prevalent in young adults as 1 in every 5 stroke patients seen was a young adult. In addition to the traditional risk factors, HIV/AIDS and chronic use of coffee drinks were also noted as emerging risk factors. There is need for a continuous health education and strong campaign on primary stroke prevention. Also, there is need for training of more neurologists with interest in stroke management and establishing comprehensive stroke centers at national, regional and local levels in order to contend adequately with the rising burden of stroke in young adults.

Keywords

Stroke, Young Adults, Risk Factors, Case Fatality Rate

1. Introduction

Stroke is characterized as a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral hemorrhage (ICH), and subarachnoid hemorrhage (SAH) [1]. It is a major cause of disability and death worldwide [1]. It affects both gender and it's increasingly common from the sixth decade, although young patients are not exempted [2]. People of African descent are more susceptible than their Caucasian counterparts [3]. Studies on Stroke in young adults have used varied aged ranges [4] [5] [6] but we used 18 to 50 years in this study. The proportion of first-ever stroke in young adults differs from country to country, ranging from <5% to 20% of all strokes [7] [8] [9]. Eze *et al.* [10] reported that 19% of all stroke cases occurred in young adults in southeastern Nigeria in 2013 while Sarfo *et al.* [11] reported 24.3% in a multicentre case—control study in Nigeria and Ghana 2018. Stroke in the young is particularly tragic because the patients are in their most productive years in life with many responsibilities and dependents especially in sub-Saharan Africa where extended family system is prevalent. This will create a long-term burden on the victims, their families, and the community at large [5]. There are limited studies of stroke in young adults in Nigeria especially in south eastern part despite the devastating effects of stroke in this age group. It is against this background that we embarked on this prospective hospital based study to determine the epidemiology, pattern and case fatality rate of stroke in young adults in Abakaliki Southeastern part of Nigeria.

2. Materials and Methods

This is a prospective longitudinal observational hospital based study where consecutive stroke patients admitted to the medical wards of the Alex Ekwueme Federal University Teaching Hospital Abakaliki (AEFUTHA) were recruited from 1st August 2012 to 30th April 2019. The patients were admitted from medical emergency room or medical outpatient clinics. The stroke patients between the ages of 18 and 50 years who had neuro-imaging (computed tomography/magnetic resonance imaging) confirmed stroke were included in the study. Relevant data like biodata, clinical features, risk factors and modified Rankin scale score (mRS) of the patients were extracted and analyzed at presentation. They were followed up to either discharge or death and their mRS was also noted. Hypertension was defined as admission systolic blood pressure of ≥ 140 mmHg and/or diastolic blood pressure of ≥ 90 mmHg or prior use of anti-hypertensive medications. Diabetes mellitus was defined as random blood glu-

cose of ≥ 200 mg/dl or fasting blood glucose of ≥ 126 mg/dl and polyuria or prior use of anti diabetic medications. Dyslipidaemia is defined as serum Triglyceride > 150 mg/dl, or High density lipoprotein < 40 mg/dl for males and < 50 mg/dl for females or prior specific treatment for dyslipidaemia. Obesity is defined as waist circumference of ≥ 94 cm in males and ≥ 80 cm in females. Alcohol abuse is defined as use > 21 units/week for males and > 14 units /week for females. The number of units of alcohol in a drink can be determined by multiplying the volume of the drink (in millilitres) by its percentage (Alcohol by volume), and dividing by 1000 [12]. Chronic excessive use of caffeinated drinks is defined as dependence (psychological or physiological) on caffeinated drinks with presence of ≥ 2 caffeine withdrawal symptoms like headache, anxiety, poor concentration, tremors, and depression. The patients were also screened for Human immune deficiency virus (HIV). The data was analyzed using SPSS version 19. Chi square and Fisher exact test were used to test for statistical significance of categorical variables and student t-test for numerical variables. p value of less than 0.05 is taken to be significant.

3. Results

During the study period from 1st August 2012 to 30th April 2019, a total of 983 (males—511, females—472) stroke cases were admitted to medical wards. Out of the 197 (20% of total stroke patients) patients that were between 18 to 50 years, 152 (77%) did brain neuro-imaging (Computed Tomography/magnetic resonance imaging scan) and were eligible for the study. The range was 26 - 49 years with mean age of 40.7 ± 9.3 years. The age distribution is shown in **Table 1**. Eighty-eight (57.9%) had Cerebral infarct (males—42, females—46) while 64 (42.1%) had Hemorrhagic stroke (males—35, females—29). For those that had hemorrhagic stroke, 11 (17.2%) were Subarachnoid hemorrhage (SAH) (Male—32%, Females—68%) while 52 (82.8%) were Intracerebral hemorrhage (ICH) (Males—61%, Female—39%). The identified risk factors range from hypertension, DM, dyslipidemia, obesity, alcohol abuse, smoking, HIV and chronic use of caffeinated drinks. The details are shown in **Table 2**. Admission mean modified Rankin scale (mRS) was 4.2 while the discharge mRS at discharge was 2.5. The details are shown in **Table 3**. Sixteen patients died during the admission with case fatality rate of 10.5%. The details are shown in **Table 4**.

Table 1. Age distribution.

Age range (years)	Male n (%)	Female n (%)	Total N (%)
≤ 30	7 (4.6)	1 (0.7)	8 (5.3)
31 - 40	15 (9.9)	26 (17.1)	41 (27.0)
41 - 50	58 (38.2)	45 (29.6)	103 (67.8)
Total	80 (52.6)	72 (47.4)	152 (100.0)

Table 2. Identified risk factors.

Risk factor	Cerebral infarct (%) n-88	Hemorrhagic stroke (%) n-64	p-value
Hypertension	50 (56.8)	52 (81.3)	0.0017
Diabetes mellitus	13 (14.8)	29 (45.3)	<0.05
Dyslipidemia	11 (12.5)	17 (26.6)	0.0344
Obesity	12 (13.6)	15 (23.4)	0.1359
Alcohol abuse	14 (15.9)	2 (3.1)	0.0143
Smoking	12 (13.6)	1 (1.6)	0.008
HIV/AIDS	8 (9.1)	4 (6.3)	0.762
Chronic use of Coffee drinks	4 (4.5)	1 (1.6)	0.3982

Table 3. Modified Rankin scale (mRS).

mRS	Admission (%) n-152	Discharge (%) n-152
0 - 1	11 (7.2)	50 (32.9)
2 - 3	64 (42.1)	74 (48.7)
4 - 5	77 (50.7)	12 (7.9)
6	0 (0.0)	16 (10.5)

Table 4. Stroke outcome.

Outcome	Cerebral infarct (%) n-88	Hemorrhagic stroke (%) n-64	p-value
Dead	2 (2.5)	14 (19.7)	0.000043
Survived	86 (97.5)	50 (80.3)	

4. Discussion

This is the first study on stroke in young adults in Abakaliki Southeastern Nigeria. During the study period, a total of 983 stroke cases were seen with 152 (15.5%) occurred in young adults. This is in keeping with other studies that reported >5% - 20% [7] [8] [9] [10] though lower than 24.3% reported by Sarfo *et al.* [11]. This difference could result from exclusion of stroke patients who did not do neuroimaging from this study. When the stroke patients that did not do neuroimaging are included in the analysis, it will come up to 20%. This suggests that stroke is actually prevalent in young adults as against the notion that it is disease of the elderly. The morbidity of stroke in this age group is far reaching as they are in their most productive years of life. This contributes to huge disability adjustable life years (DALYs).

The sex distribution of males—80 (52.6%) and females—72 (47.4%) with sex ratio was about 1:1 is similar to the report of Onwuchekwa *et al.* in South-south Nigeria [13]. Owolabi *et al.* reported a higher prevalence in young males than female folks in Northwestern Nigeria [5]. This finding could suggest that the

prevalence of stroke may actually be in the rise amongst young female folks. It could also be a false picture in support of the report that women have better health seeking behavior in Nigeria and are more likely to come to the hospital when ill than their male counterparts [14].

The age distribution revealed an increase in stroke prevalence with increase in age as 68% of the patients were between age range of 41 - 50 years. This is similar to other hospital based studies in Nigeria [5] [15]. This is not surprising as increasing age is an established risk factor for stroke. Also the prevalence of other stroke risk factors increases with age.

Cerebral infarct was 57.9% while hemorrhagic stroke was 42.1% in this study. This is similar to the 59% for cerebral infarct and 41% for hemorrhagic stroke reported by Owolabi *et al.* [5] but in variance with Oyinloye *et al.* [15] who reported 48.3% for cerebral infarct and 51.7% for hemorrhagic stroke and Sarfo *et al.* [11] who reported 47.5% and 52.5% for ischemic and Hemorrhagic strokes respectively. The variance could stem from the fact that Oyinloye *et al.* [15] reported neuroimaging results at a neuroimaging centre which could be biased as hemorrhagic strokes, which is usually more severe are more likely to do neuroimaging than the ischemic counterpart. Sarfo *et al.* [11] did a multicentre study in Ghana and Nigeria with larger sample size which excluded southeastern Nigeria where this study was carried out. There may be variance in local health determinants which include feeding pattern, health seeking behaviors and cultural practices that could have affected the findings.

For those that had hemorrhagic stroke, 17.2% were subarachnoid hemorrhage (SAH) while 82.8% had intracerebral hemorrhage. This is similar to 32% and 68% reported by Oyinloye *et al.* [15] Subarachnoid hemorrhage is assuming a big role in the morbidity and mortality of stroke in Nigeria considering its poor prognosis. SAH was more preponderant amongst female patients as 68% were female. This is expected as berry aneurysm, which is the most common risk factor for SAH is more prevalent in women [16].

The identified risk factors were hypertension, Diabetes mellitus, dyslipidemia, obesity, alcohol abuse, smoking, HIV/AIDS and chronic use of coffee drinks in descending order of frequency. This is similar to the findings of other hospital based studies in Nigeria [5] [15] [17] except that none of them reported chronic use of coffee drinks. The chronic use of coffee drinks was noted more in cerebral infarct. This association is not unexpected as caffeine is known to induce endothelial cell dysfunction which is a harbinger for atherosclerosis and cerebral infarct [18].

About 80% of the patients made significant recovery at discharge (mRS—0 - 3), with a case fatality rate of 10.5% which is lower than 23.9% reported by Owolabi *et al.* and 29.6% reported by Onwuchekwa *et al.* [5] [13].

The lower case fatality rate in this study could stem from the fact that most of the patients were managed in a Neurology unit with interest in stroke. Exclusion of fatality at medical emergency room in this study could also have led to lower case fatality rate recorded.

Eighty-eight per cent of the mortality had hemorrhagic stroke. This is expected as hemorrhagic stroke is known to have a worse prognosis than cerebral infarct [19].

5. Conclusions and Recommendations

This study revealed that stroke is actually prevalent in young adults as 1 in every 5 stroke patients seen was a young adult. There was almost equal sex distribution with majority of the cases in their fifth decade of life. Cerebral infarct was more prevalent with almost equal sex distribution while ICH and SAH were more preponderant amongst the male and female folks respectively. In addition to the traditional risk factors, HIV/AIDS and chronic use of coffee drinks were also noted as emerging risk factors. The case fatality rate was relatively low.

There is need for continuous health education and strong campaign on primary stroke prevention. Also, there is need for training of more neurologists with interest in stroke management and establishing comprehensive stroke centers at national, regional and local levels in order to contend adequately with the rising burden of stroke in young adults.

Limitations

The exclusion of the stroke patients that died at emergency room could have affected the case mortality rate.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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